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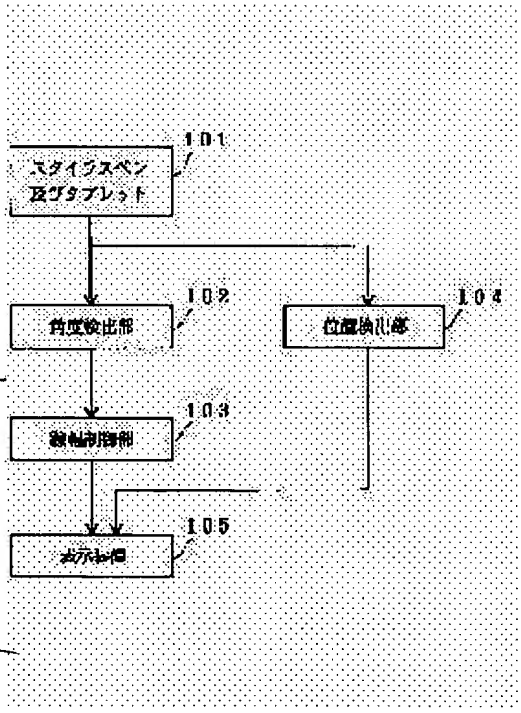
(54) HANDWRITTEN GRAPHIC INPUT DEVICE

(57)Abstract:

PURPOSE: To provide a handwritten graphic input device which can control the line width of a relevant locus in accordance with the tilting degree to the surface of a tablet.

CONSTITUTION: A handwritten graphic input device consists of a position detector means 104 which detects the position of a stylus pen touching on a tablet, an angle detector means 102 which detects the angle formed between the tablet and the stylus pen, a line width control means 103 which controls a line width at the time of displaying locus of the stylus pen based on the angle detected by the means 102, and a display means 105 which displays the locus line width of the stylus pen as changing the line width based on the position information and the line width information acquired by the means 104 and 103 respectively.



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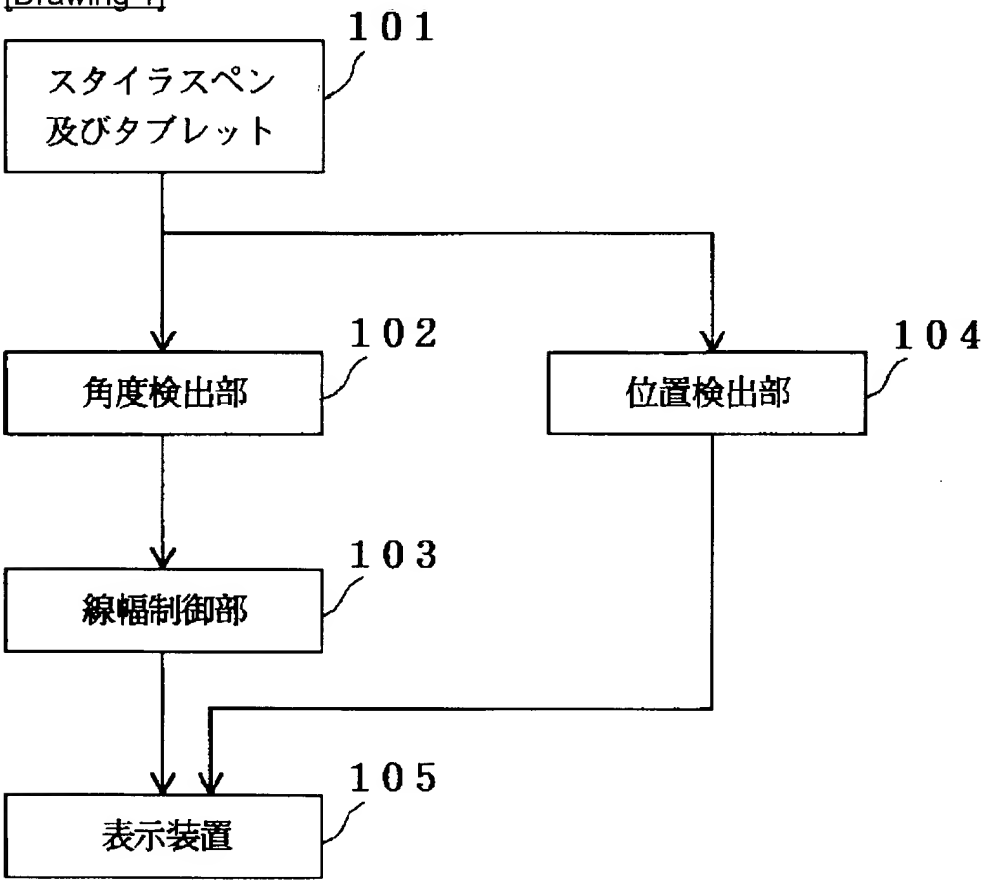
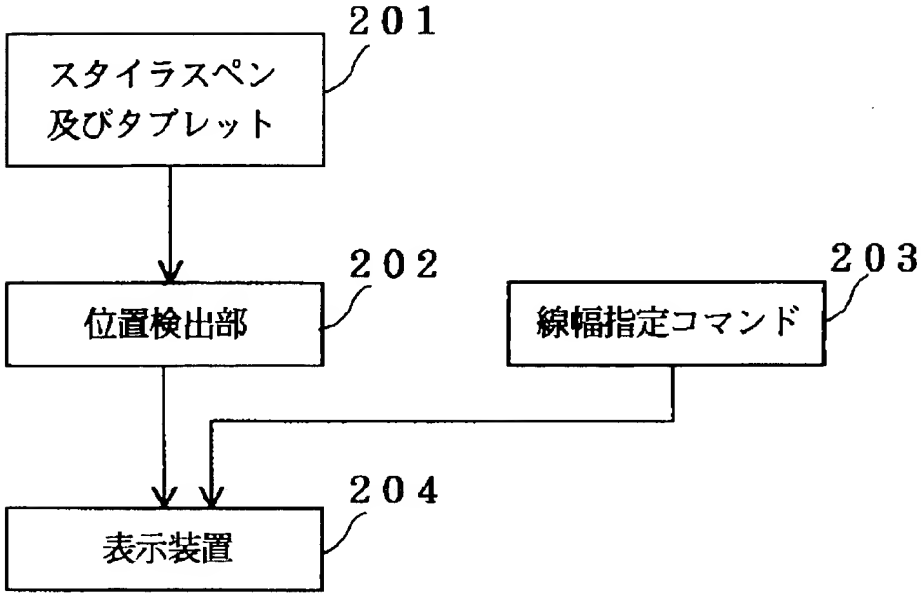
DRAWINGS

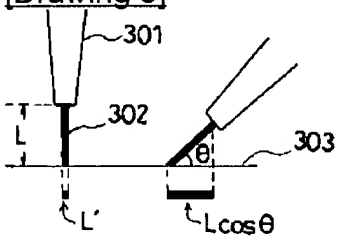
[Drawing 1]



[Drawing 2]



[Drawing 3]



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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the freehand drawing form input unit which performs the directions and graphical input to a computer in handwriting.
[0002]
[Description of the Prior Art] An operator draws a graphic form and an alphabetic character on a tablet side with a stylus pen, and makes the coordinate data of the location in those tablet sides input into a computer on real time with a freehand drawing form input device generally. That is, a graphic form to input, a segment, or the character position is changed into the coordinate location data of the direction of X, and the direction of Y, and it is made to input into a computer.
[0003] Here, a stylus pen has the coil which generates alternating field at the head, and usually has a pen down switch for making the signal which shows the condition of saying that the pen is drawing further. Moreover, as for the tablet, the sense line is usually embedded in the X and the direction of Y. And if the graphic form and alphabetic character which input a it top with a stylus pen are traced, the leakage flux from the coil prepared at the head of a stylus pen will be gathered by the intersection of a sense line, and will be taken out as a coordinate signal through a sense circuit.
[0004] In addition, the product which even the circumference circuit pattern of high quality unified is being made into a dramatically accurate electric insulating plate by carrying out etching formation of the sense line by the end of today. By the way, if those line breadth is changed and displayed when indicating the graphic form and alphabetic character which were inputted as mentioned above by the output, it comes to be able to perform a more effective expression. However, in the conventional freehand drawing form input unit, the line of a graphic form or an alphabetic character was inputted as it being always also at fixed line breadth, and it was indicated to it being also at the same fixed line breadth by the output. For this reason, when it was going to give change to the line breadth of the graphic form which it is going to display, or an alphabetic character, it corresponded by calling a line breadth designated command if needed.
[0005] Drawing 2 is the block diagram showing the configuration of the conventional freehand drawing form input device. In drawing 2 , a line breadth assignment command for a location detecting element for a stylus pen for 201 to perform graphical input by handwriting and a tablet, and 202 to detect the location where the stylus pen contacted the tablet, and 203 to specify the line breadth of the inputted graphic form, and 204 are the displays for making a display screen indicate the inputted graphic form by the output.
[0006] The actuation of this freehand drawing form input unit is as follows. That is, if a graphic form is drawn in handwriting using a stylus pen and a tablet 201, the coordinate of the locus to which the stylus pen moved the tablet top will be detected by the location detecting element

202. Moreover, when the line breadth of the locus of a stylus pen can be chosen, assignment of line breadth is performed by the line breadth assignment command 203. In addition, about the line breadth assignment command 203, in case the inputted graphic form is generally displayed on a display 204, a line breadth menu is displayed beforehand, and when this menu is seen and an operator chooses those contents (a thin line, thick wire, etc.), it is carried out. And an output indication of the locus of a stylus pen is given by the indicating equipment 204 with an indicating equipment 204 at a display screen based on assignment of the line breadth from the line breadth assignment command 203, and the positional information from the location detecting element 202.

[0007]

[Problem(s) to be Solved by the Invention] However, according to the above-mentioned conventional freehand drawing form input unit, since it is fixed to what was specified, the line breadth of the graphic form by handwriting cannot conquer monotony covering the whole graphic form. Therefore, a graphic form cannot be drawn by natural touch which draws a picture on paper with pen.

[0008] This invention is made in view of this actual condition, and it aims at offering the freehand drawing form input unit which makes it possible to control the line breadth of the locus according to the degree of an inclination to the tablet side of a stylus pen.

[0009]

[Means for Solving the Problem] In order to attain the above-mentioned object, the freehand drawing form input unit concerning this invention A location detection means to detect the location of the stylus pen contacted on the tablet, This tablet and an include-angle detection means to detect the include angle which a stylus pen makes, The line breadth control means which controls the line breadth at the time of displaying the locus of a stylus pen based on the include angle detected by this include-angle detection means, It is characterized by having a display means to change line breadth and to display the locus of a stylus pen, based on the positional information and line breadth information which were acquired by said location detection means and said line breadth control means.

[0010]

[Function] According to the above-mentioned configuration, in a freehand drawing form input device, a location detection means detects the location of the locus of the stylus pen when carrying out contact migration of the tablet top, and forms positional information. Moreover, simultaneously, an include-angle detection means detects the include angle which a tablet and a stylus pen make, and forms include-angle information.

[0011] Next, a line breadth control means calculates the line breadth at the time of displaying the locus of a stylus pen based on the include-angle information which the include-angle detection means formed, and forms line breadth information. Then, based on the positional information and line breadth information which were formed, a display means changes line breadth and indicates the locus on the tablet of a stylus pen by the output at a display screen. Consequently, a graphic form is displayed on a screen by natural touch.

[0012]

[Example] Hereafter, one example of the freehand drawing form input unit concerning this invention is explained concretely, referring to a drawing. Drawing 1 is the block diagram showing the configuration of the freehand drawing form input device concerning this invention. As for 101, as for a stylus pen and a tablet, and 102, in drawing 1 , an include-angle detecting element and 103 are displays with which a line breadth control section and 104 have a location detecting element, and 105 has a display.

[0013] The actuation of this freehand drawing form input unit is as follows. That is, if a graphic form is drawn in handwriting using a stylus pen and a tablet 101, the coordinate of the locus at the time of a stylus pen moving in a tablet top will be detected by the location detecting

element 104. Moreover, the include angle which a stylus pen and a tablet make is simultaneously detected by the include-angle detecting element 102. Here, as the detection approach of an include angle, the inclination error correction function of the stylus pen used with the usual freehand drawing form input unit can be used, for example. That is, this include angle is detectable by detecting the transceiver condition of a stylus pen and the RF signal between tablets.

[0014] And the include angle detected by the include-angle detecting element 102 is passed to the line breadth control section 103. Then, the line breadth control section 103 determines the die length of the imagination heart of a stylus pen beforehand, and calculates the die length and die length when the virtual heart of a stylus pen is projected on a tablet based on the information on the include angle obtained from the include-angle detecting element 102 as line breadth. In addition, about the length of this virtual heart, in order to acquire line breadth information, it is considering as the constant set up on count.

[0015] Drawing 3 is an explanatory view for explaining a stylus pen and the method of acquiring the line breadth information on a stylus pen from the information on the include angle which a tablet makes. In drawing 3 , 301 shows the tablet side where, as for a stylus pen and 302, the virtual heart touches, and, as for 303, the head of a stylus pen 301 touches. As shown in drawing, the die length of the virtual heart 303 of a stylus pen 301 is set to L, when the include angle at which the projection length to theta, then the tablet side 303 of the virtual heart 303 makes the include angle of the virtual heart 303 and the tablet side 303 to make is 90 degrees, it becomes width-of-face L' of the virtual heart, and it is set to Lcos theta when the include angle to make is theta. That is, about the line breadth of a stylus pen 301, it is die-length xcos (whenever [angle-of-inclination / of a stylus pen]) of the degree type line breadth = virtual heart.

It can ask using the formula to say.

[0016] Thus, about the line breadth information acquired from include-angle information, it is regarded as what was brought close to the sensation of the line breadth in a brush partly. That is, when standing a stylus pen 301 in drawing lightface, and drawing a bold letter, it is the sensation of leaning a stylus pen 301. Therefore, what is necessary will be just to draw a picture and a graphic form for those who operate a stylus pen 301 bearing in mind the inclination condition of a stylus pen 301. And the line breadth information searched for by doing in this way is passed to a display 105. Then, a display 105 displays the locus of a stylus pen 301 on a display screen with the positional information from the location detecting element 104 based on the line breadth information from the line breadth control section 103.

[0017] In addition, although an operator's individuality can also be made to add to line breadth information if the line breadth information on this stylus pen 301 can be seasoned with writing pressure information, only the approach of acquiring line breadth information simply here is offered. Moreover, when it is better not to take out individuality to reverse, you may make it process the line breadth information acquired in distinction from several steps in the line breadth control section 103. That is, the value of line breadth (Lcos theta) may be classified into how many steps of range, and you may process so that the data of each phase may be changed as line breadth information to a thin line - a thick wire.

[0018]

[Effect of the Invention] While detecting the location of the stylus pen contacted on the tablet in the freehand drawing form input device which performs graphical input in handwriting with the tablet and the stylus pen according to the above this invention, by detecting the include angle which a tablet and a stylus pen make, line breadth can be changed and the locus on the tablet of a stylus pen can be indicated by the output.

[0019] Therefore, by natural touch like [when drawing a picture on paper using a brush], the locus of a stylus pen can be reproduced on a display screen, and it becomes possible to make

power of expression, such as a graphic form, very rich.

[Translation done.]